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Studying the Level of Liver Enzymes and Lipid Profile in Long-ear Hedgehog (*Hemiechinus auritus*)

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ABSTRACT: Blood, as a fluid and easy-access tissue, is one of the most important fluids of the body that its composition is exposed to fluctuations and changes under the influence of biological and pathological states. Therefore, awareness about the normal values of blood parameters and the way they change in different diseases has always been an important tool in the diagnosis of diseases in humans and animals. Long-ear hedgehog is one of the animal species found in Central Asia and the Middle East countries. In order to study the serum biochemical parameters including liver enzymes and lipid profile, blood samples were taken from 20 long-ear hedgehogs (8 males and 12 females). The results showed that mean ± standard deviation of cholesterol, triglyceride (in mmol/L), AST, ALT, and ALP (U/L) in males and females is equal to 3.75±0.74 and 3.66±0.67, 0.85±0.15 and 0.77±0.14, 22.75±5.5 and 31.63±8.68, 52.41±6.74 and 57.63±9.25, and 35.08±10.63 and 33.45±10.30, respectively. A significant difference was observed between males and females in terms of AST levels (P<0.008).

Keywords: Liver enzymes; Lipid profile; Long-ear hedgehog

INTRODUCTION

Long-ear hedgehog lives in countries such as Iran, Iraq, Egypt, Syria, China, and Uzbekistan. This species is mostly insectivorous but may also feed on vegetables and small plants (Poddar *et al.,* 2011; Qumsiyeh, 1996). Parasitic infections that causes severe anemia and transmission of infectious diseases, tumors, gingivitis, and bacterial and fungal diseases are factors that have jeopardized the life of this species (Thamm, 2009; Christian, 2014). Moreover, hedgehogs can carry the pathogens of common diseases such as *Salmonella*, *Yersinia pseudotuberculosis*, *Rhabdoviruses*, *Hanta* virus, and *Trichophyton mentagrophytes* (Riley & Chomel, 2005). In recent years, many studied have been conducted on diseases of hedgehog and especially parasitic diseases (Thamm, 2009). Hematological and biochemical parameters have been also investigated in African and European hedgehog (Christian *et al.*, 2014; Rossi *et al.*, 2014). However, it seems that no scientific study has been carried out on long-ear hedgehog. Since blood is the body's biggest transmission system and any invasion of pathogens, traumas, and stresses is reflected in changes in serum biochemical parameters, determining the values of biochemical parameters in any species in healthy state seems to be essential, because these data can be used in the future for the diagnosis and treatment of diseases and further scientific studies. Hence, the present paper aims to study liver enzymes and lipid profile including alkaline phosphatase (ALP), aspartate amino transferase (AST), alanine amino transferase (ALT), cholesterol, and triglyceride in long-ear hedgehog.

MATERIALS AND METHODS

In this study, 20 long-ear hedgehogs (8 males and 12 females) were collected from roads, farmlands, and scrubs In Sistan region during springer and transferred to Laboratory of Biochemistry, Faculty of Veterinary Medicine, Zabol University. After clinical examinations and ensuring the full health of subjects, blood sampling was done from jugular vein using a 22 gauge needle and a 2.5 ml syringe (Rossi *et al.,* 2014). Blood samples were centrifuged for serum isolation. Then, micro-tubes containing serum were stored for 2 weeks at -20°C. Blood biochemical parameters including triglyceride, cholesterol, AST, ALT, and ALP were measured using Pars Test Company kits and Selectra proM auto-analyzer. The obtained data were statistically analyzed by Sigma State 3.5.

RESULTS

The results of measurement and analysis of liver enzymes and lipid profile of blood serum in long-ear hedgehogs are shown in Table 1. A significant difference was observed between males and females in terms of AST levels (P<0.008).

Table 1: Values of liver enzymes and lipid profile in the studied long-ear hedgehog.

Biochemical parameters	Unit	Male	Female	P-value
Cholesterol	mmol/L	3.75±0.74	3.66±0.67	0.73
Triglyceride	mmol/L	0.85±0.15	0.77±0.14	0.19
AST	U/L	22.75±5.5	31.63±8.68	0.008
ALT	U/L	52.41±6.74	57.63±9.25	0.13
ASP	U/L	35.08±10.63	33.45±10.30	0.50

DISCUSSION

Levels of liver enzymes and lipid profiles in other species of hedgehog and small mammals are presented in Table 2. Enzymes have a wide range of activities and changes and it is difficult to interpret the difference of enzymes in various species. Since enzymes level is influenced by factors such as muscle injuries, damages to organs, nutritional conditions, physical activity, hemolysis, treatment, and even storage of samples, it is an important diagnostic marker in veterinary (Samadiyeh and Qodsian, 2006). Alkaline phosphatase (ALP) increases in liver and bone turmoil and is of great importance in these cases. Obstruction of the biliary tract, cortical adrenal gland hyperfunction, hypothyroidism, late gestation, and starvation increase the activity of this enzyme in blood serum (Mojabi, 2000). ALP level in long-ear hedgehog is higher than African hedgehog, lower than European hedgehog, and within the normal activity of this enzyme in rat and Hindi pig (Table 2).

AST exists in the mitochondria of most of cells and also in plasma, thus it cannot be used as a specific enzyme. However, combined with other enzymes, AST can be helpful in better diagnosis of lesions in the liver and muscles (Mojabi, 2000). AST activity level in the studied long-ear hedgehog is lower than that of African hedgehog, Hindi pig, and rat (Table 2). Being a liver-specific enzyme, ALT activity level significantly increases in blood serum in acute liver diseases causing membrane damage or cellular necrosis. ALT level in long-ear hedgehog is higher than African hedgehog, lower than European hedgehog, and within the normal activity of this enzyme in rat and Hindi pig (Table 2). In addition, according to study findings, cholesterol and triglyceride levels in long-ear hedgehog are equal to the values reported from African hedgehog (Table 2). On the other hand, cholesterol level in long-ear hedgehog is higher than Hindi pig and rat and triglyceride in this species is lower than other small mammals (Table 2). Knowing the normal levels of liver enzymes and lipid profile can be useful for early diagnosis and treatment of diseases.

Table 2: Values of liver enzymes and lipid profile in African hedgehog (Atelerix albiventris), European hedgehog (Erinaceus europaeus), Hindi pig and rat (Kabir and Pazdezh, 2002; Christian *et al.*, 2014; Rossi *et al.*, 2014).

Biochemical parameters	African hedgehog	European hedgehog	Hindi pig	Rat
Cholesterol (mmol/L)	3.31±0.13	3.7±0.8	0.4-1.65	1-3.25
Triglyceride (mmol/L)	0.94±0.02	0.36±0.15	0-1.59	0.28-1.90
AST (U/L)	33.52±3.49	-	27-68	42.9-262
ALT (U/L)	22.80±1.44	81±37.5	10-59	16-150
ASP (U/L)	22.43±0.95	141.4±48	18-10	16-250

CONCLUSION

The results showed great differences between species of hedgehog and other small mammals in terms of liver enzymes and lipid profile. Also, a significant difference was observed between males and females in AST activity level, suggesting the impact of gender on the activity of this enzyme. Awareness about the normal levels of liver enzymes and lipid profile in long-ear hedgehog can pave the way for laboratory studies and early diagnosis of diseases in this species.

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